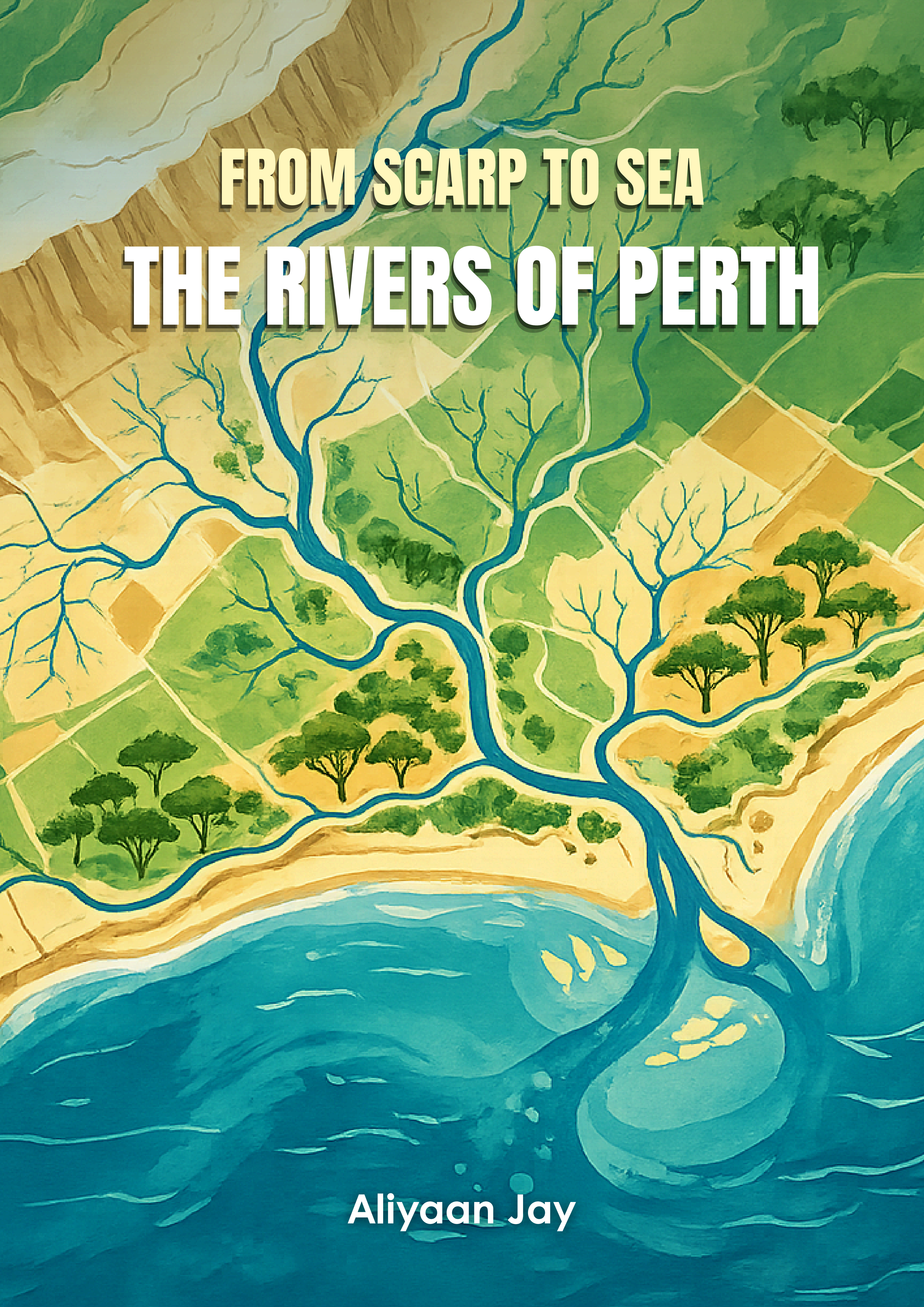

FROM SCARP TO SEA
THE RIVERS OF PERTH

Aliyaan Jay

From Scarp To Sea: The Rivers Of Perth

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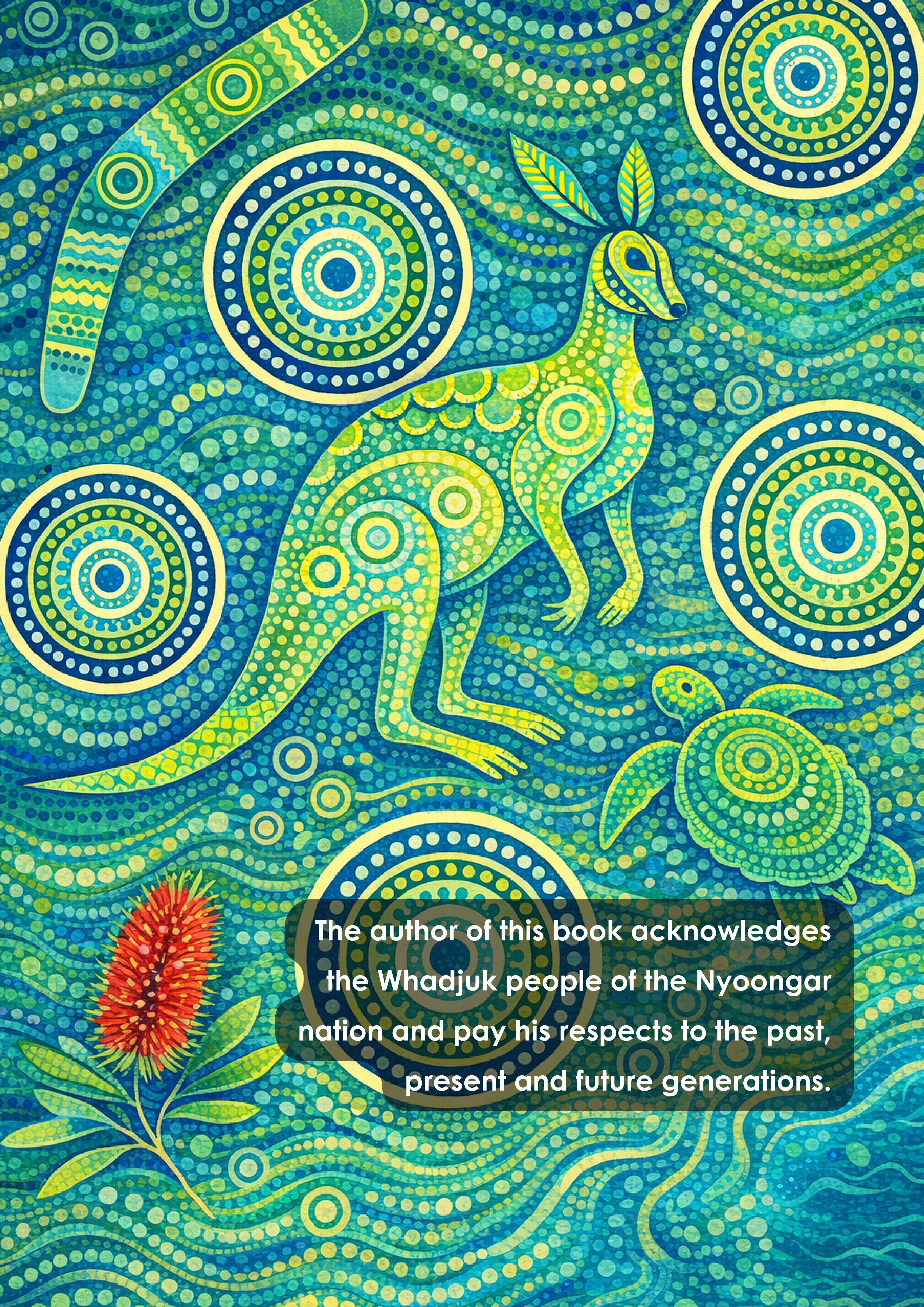


The author of this book acknowledges the Whadjuk people of the Nyoongar nation and pay his respects to the past, present and future generations.

Acknowledgments

I would like to thank my parents, my friends Caden and Cody, and everyone who supported me throughout the journey of writing my first book.

This book has been designed to be a fun, multi-sensory learning experience! You can read it, listen to it, look at the pictures, and even visit the places shown in the pictures using the location pins provided.

Prologue

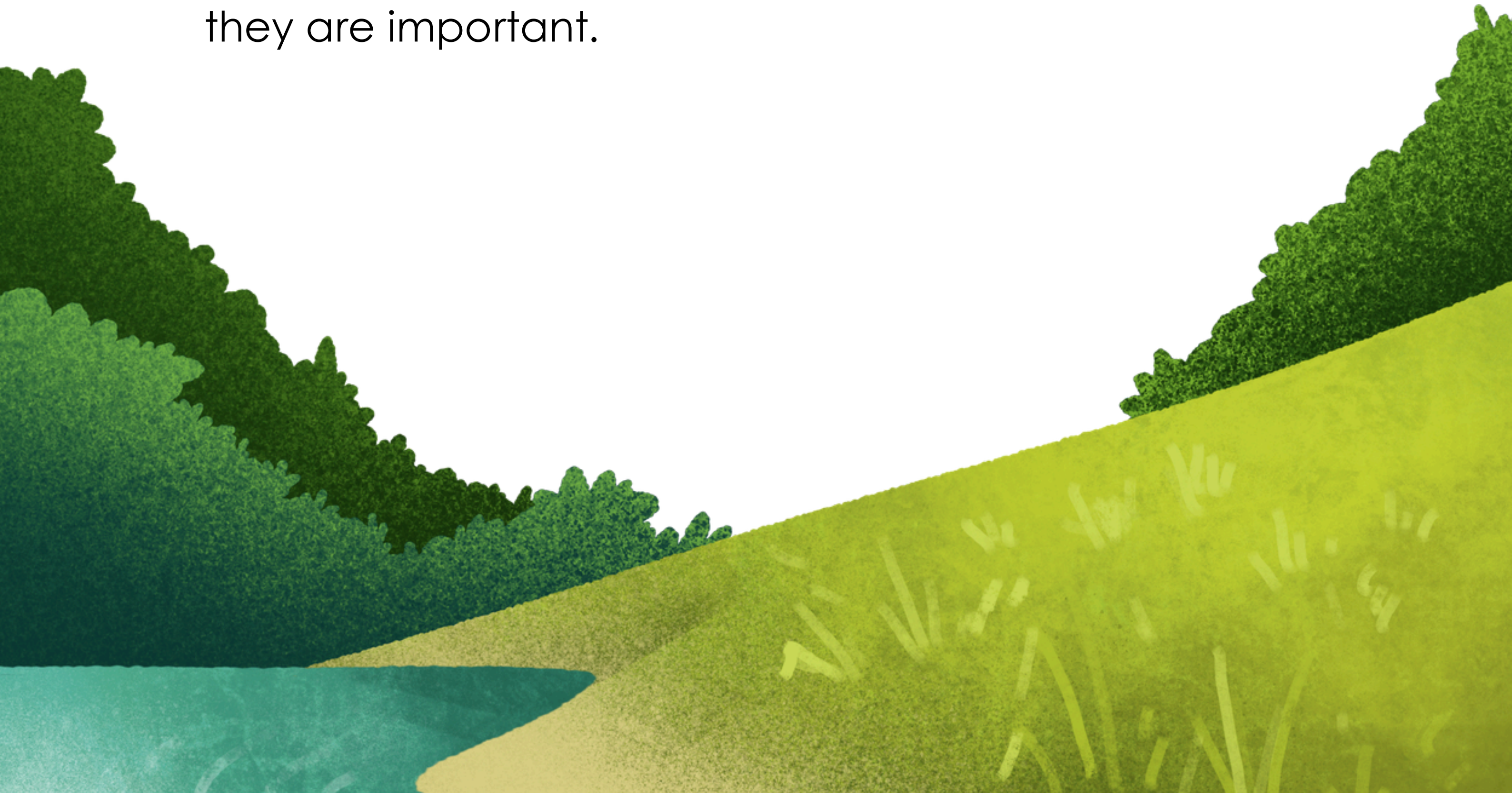
All across Western Australia, waterways—creeks, brooks, billabongs, and rivers—are scattered throughout the dry, arid deserts and plains. They provide water and habitat that people, plants, and animals benefit from, yet their importance is often overlooked. They form a complex network of catchments, tributaries, groundwater sources, and seasonal flows that are all connected. They move water across the landscape.

Although this system is always working, many people do not notice how closely these parts are linked together.

In this book, I explore the brooks and waterways of the Perth region, covering the major systems in the area.

The chapters are organised to follow the journey of water across the landscape—from the Perth Hills and Darling Scarp, through the foothills and main rivers, and finally to the coastal plain and ocean. From fast-flowing rapids along the scarp to slow-moving streams on the coastal plain, each waterway plays a role in shaping the land. Many of these waterways join together to form the Swan River, which eventually flows into the Indian Ocean, while others help supply water within the region.

Each chapter includes glossaries to explain key terms and location pins to help readers explore these places more easily. This book aims to make it easier to understand how Perth's waterways work and why they are important.



Glossary

of the key terms
used in prologue

- **Arid deserts:** Very dry areas that receive little rain and have limited water sources.
- **Billabongs:** Still pools of water left behind when a river changes course or dries up.
- **Brooks:** Very small, gentle streams, usually narrower than creeks.
- **Catchments**: Areas of land where rainfall collects and drains into a river or water system.
- **Coastal plain:** Flat, low-lying land near the coast, often close to sea level.
- **Creeks**: Small streams of water, often smaller than rivers and sometimes seasonal.
- **Groundwater sources**: Water stored underground in soil or rocks that can be used for drinking or irrigation.
- **Plains:** Large, flat areas of land with few hills or mountains.
- **Rivers**: Large natural streams of flowing water that usually empty into the ocean, a lake, or another river.
- **Scarp rapids**: Fast-flowing sections of a river where water rushes over rocky, steep slopes (like near a scarp).
- **Streams:** Small, flowing bodies of water, similar to creeks but a general term for any small flow.
- **Tributaries:** Smaller rivers or streams that flow into a larger river.
- **Waterways:** Natural paths where water flows, like rivers, creeks, and streams.

Chapter 1: Perth Hills

Most people think of the Perth Hills as tiny hills, sloped terrain and the occasional peak or two. But in reality, Perth Hills is just a local name for the Darling Scarp, a vast, ancient escarpment lasting some 345 km, about 17 km east of Perth CBD. This area is also where most major rivers flow, excluding the Murrary (WA), which goes into the Wheatbelt.

Dams, reservoirs, and artificial lakes in the early forms of major rivers are also in the Scarp.

Darling Scarp as viewed from Serpentine Dam

Scan this to navigate to Serpentine Main Dam

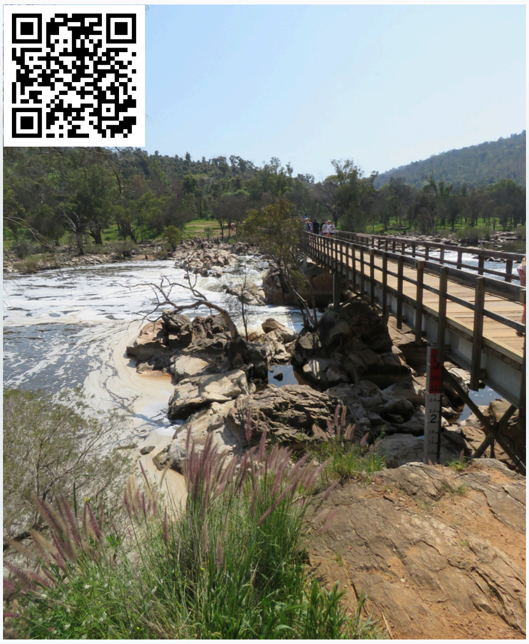
Image attribution: ShounakWA, CC BY-SA 4.0, via Wikimedia Commons

Mount Cooke, near the Western Australia town of Jarrahdale, located within the Monadnocks Conservation Park.

Scan this to navigate to Monadnocks Conservation Park

Image attribution: Calistemon, CC BY-SA 4.0, via Wikimedia Commons

Rainfall collects on the higher land and flows into small streams such as Lesmurdie Brook, Churchman Brook, and Whistlepipe Gully. These fast-moving streams travel over steep, rocky ground, forming rapids and small waterfalls as they descend the scarp.



Bell Rapids
Calistemon, CC BY-SA 4.0, via
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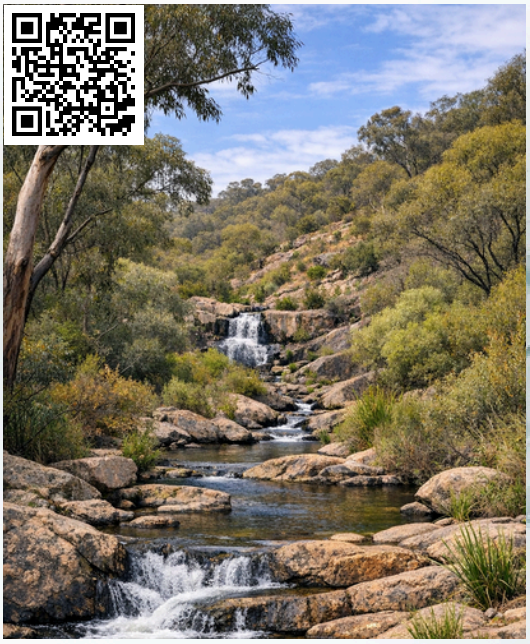

Whistlepipe Gully
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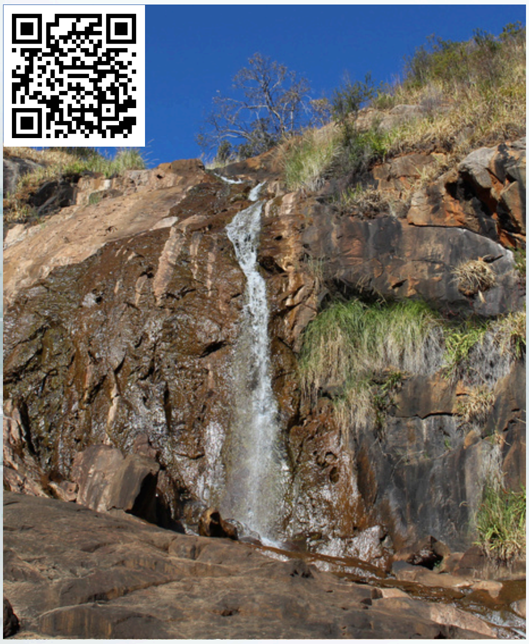

Lesmurdie Falls
Samuel Wiki, CC0, via
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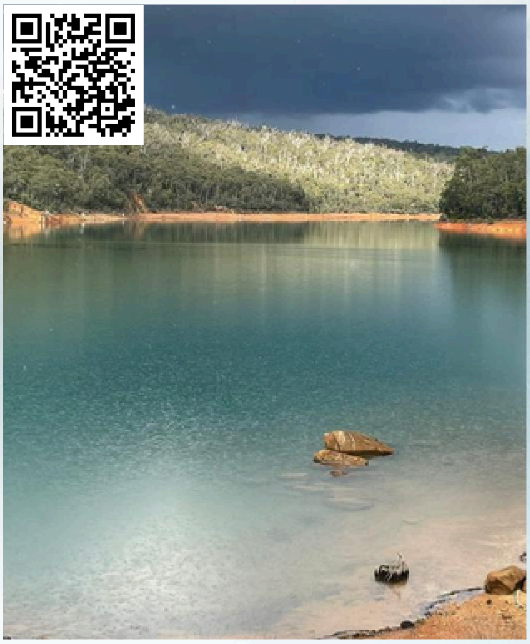

Churchman Brook Dam
ShounakWA, CC BY-SA 4.0,via
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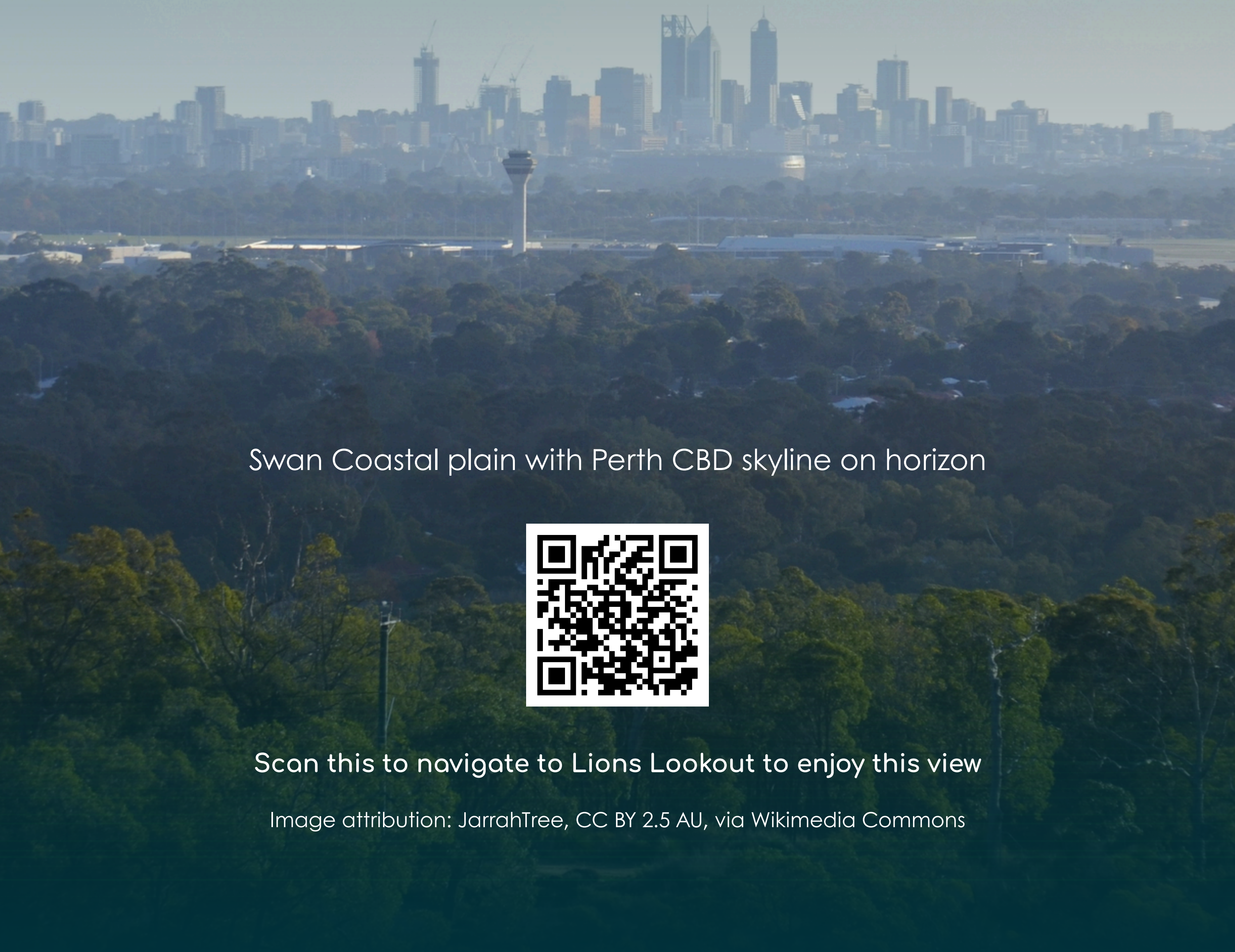
Most of the above are fast, narrow rapids that carve their way down the scarp before spilling onto the **Swan Coastal Plain**, where most of Perth's suburbs are located. Here it begins to slow and spread out. This marks the first stage of a much larger river system that continues across the Perth region.



Swan Coastal plain with Perth CBD skyline on horizon

Scan this to navigate to Lions Lookout to enjoy this view

Image attribution: JarrahTree, CC BY 2.5 AU, via Wikimedia Commons

Many of these waterways flow through the Jarrah (E. Marginata), Marri (C. calophylla) and Wandoo (E. Redunca) forests. This sub-region has a total area of 21,000+ sq km, and these species can't be found anywhere else in the world.

King Jarrah, a 500 years old tree in the Jarrah Forest, near Pemberton. It also rises over 45m.

Scan this to navigate to King Jarrah (in Wellington Forest WA 6236)

Image attribution:
Amanda Slater, CC BY-SA 2.0, via Wikimedia Commons

These water systems are not only important for the fauna in the region, but also supply water to tens of thousands of people (see prologue for more info). Some examples include Mundaring Weir, Serpentine Dam, Pipehead Dam, Victoria Dam (which supplies water to Wattle Grove), Churchman Brook Dam, Wungong Dam, Canning Dam, and North Dandalup Dam.

Mundaring Weir is a large reservoir located within both the City of Kalamunda and the Shire of Mundaring. It is the primary source of the Goldfields Water Supply Scheme, which delivers an average of approximately 25,000 megalitres (25 billion litres) of fresh water to Kalgoorlie each year. The reservoir has a maximum depth of 29.2m, and an area of 65,800,000 m^3.

Mundaring Weir

Scan this to navigate to Mundaring Weir

Image attribution: By Silverhorse, CC0, via Wikimedia Commons

Glossary

of the key terms
used in Chapter 1

- **Bell Rapids:** A fast-flowing part of the Swan River near the Perth Hills, popular for viewing rapids.
- **Churchman Brook:** A stream and reservoir area near Roleystone used for water supply.
- **Darling Range:** A low escarpment east of Perth, with a maximum height of 582m, in Mount Cooke.
- **Erosion:** The process where wind, water, or weather slowly wears away land and rocks.
- **Escarpment:** A steep slope or cliff that separates higher land from lower land.
- **Goldfields Water Supply Scheme:** A system of pipes that carries water from Perth to inland towns like Kalgoorlie.
- **Granite:** A very hard rock that forms deep underground but can be seen on the surface after the land above it is worn away.
- **Gully**: A small valley or narrow channel where water flows, often formed by erosion after rain.
- **Inselberg:** A single, isolated hill or rock that rises above flat land.
- **Jarrah forest:** A forest, mainly made up of jarrah trees, in south-west Western Australia.
- **Jarrahdale:** A large town in the Perth Hills area of Western Australia.
- **Landforms:** Natural features of the Earth's surface, like hills, valleys, and rivers.
- **Lesmurdie Brook:** A stream in the Perth Hills that flows through Lesmurdie and forms waterfalls.

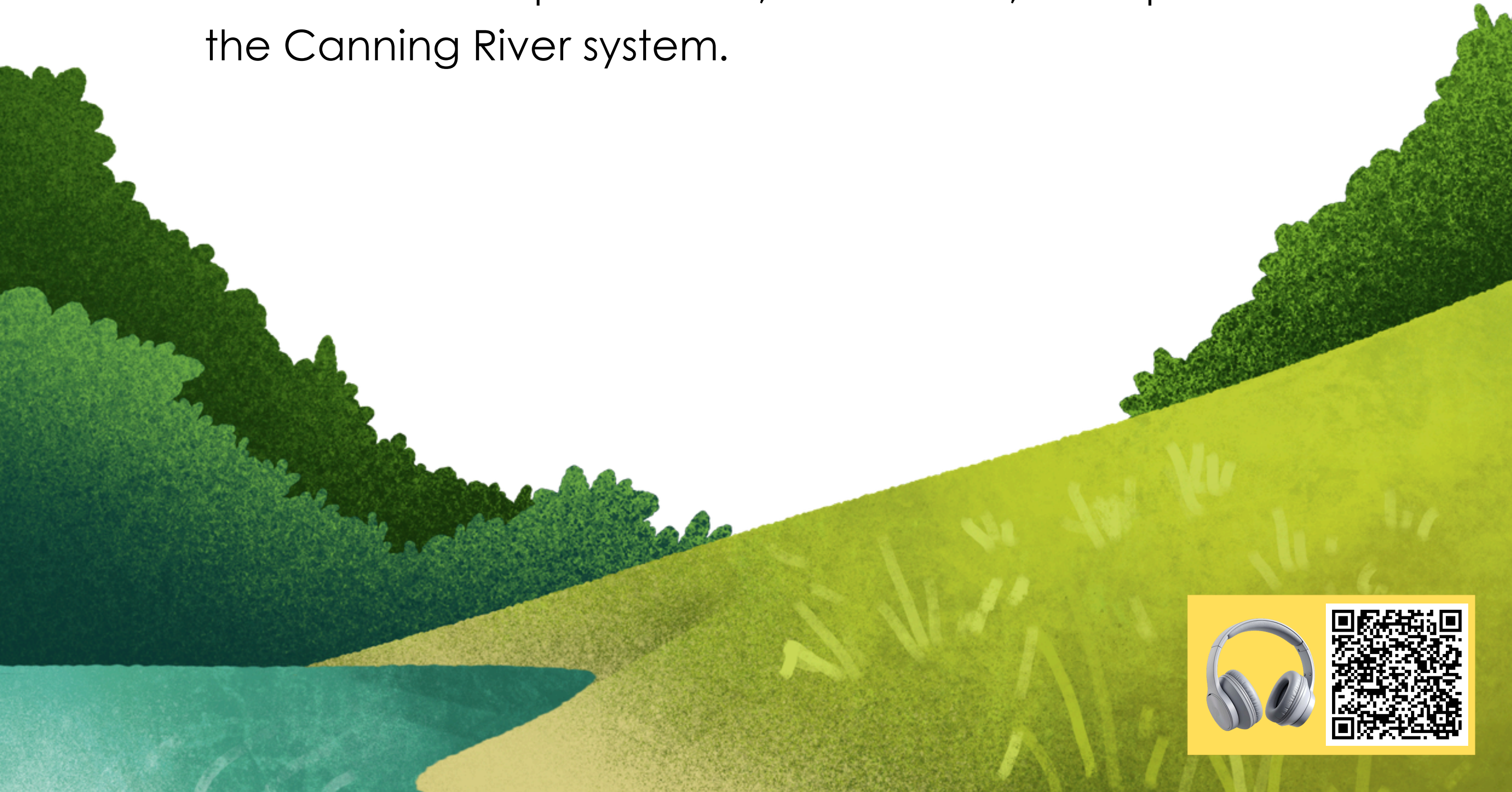
- **Lesmurdie Falls:** A waterfall formed by Lesmurdie Brook, where the stream drops steeply over the scarp as it flows down from the Perth Hills onto the Swan Coastal Plain.
- **Marri:** A type of native Australian tree that grows in the south-west, often found in forests.
- **Mundaring Weir:** A large dam near Perth that stores water for supply to communities.
- **Perth Hills:** The hilly area east of Perth, covered in forests and small valleys.
- **Rapids**: Fast-moving parts of a river where water flows quickly over rocks.
- **Reservoir:** A place where water is stored, often behind a dam.
- **Scarp**: A steep slope or cliff, often part of a larger escarpment like the Darling Scarp.
- **South West (region):** The lower corner of Western Australia, known for forests, farms, and a wetter climate.
- **Swan Coastal Plain:** A wide, flat area of land near the coast where rivers from the Perth Hills slow down, spread out, and often form wetlands or estuaries before reaching the ocean. It acts like the final stage of the river system, where fast-flowing streams from the scarp become slower and wider waterways.
- **Upper Swan:** The inland section of the Swan River, before it becomes wide and estuarine.
- **Wandoo**: A type of native tree in Western Australia, usually found in drier areas.
- **Weir:** A low dam built across a river to control or hold back the flow of water.
- **Whistlepipe Gully**: A natural area in Forrestfield with a creek, walking trails, and small waterfalls.

Chapter 2: Foothills

The foothills form the transition zone between the steep Darling Scarp and the flat Swan Coastal Plain. This area plays an important role in the journey of water, as it is where many streams from the Perth Hills come together.

As water flows down from the scarp, it begins to change speed. The fast-moving, rocky streams from the hills start to slow down as the land becomes less steep. Channels widen, and the flow becomes more steady and spread out. This is where smaller brooks begin to form larger creeks and tributaries.

Many waterways in the foothills act as collection areas, gathering water from different parts of the hills and carrying it further downstream. Examples of these include Woodlupine Brook, Yule Brook, and parts of the Canning River system.



These waterways play an important role in linking the smaller streams of the hills to the larger river systems of the coastal plain.

The foothills also support a mix of natural vegetation and growing urban areas. This means the waterways here are influenced by both natural processes and human activity. Despite these changes, they continue to move water, support plant and animal life, and connect different parts of the landscape.

Overall, the foothills mark an important stage in the river system. They show how waterways develop and change as they move from steep, fast-flowing environments to slower, wider systems that eventually lead to the main rivers and the ocean.

KENWICK
FOOTBALL CLUB
- EST. 1948 -
New Members Welcome

Yule Brook passing through Mills Park, Beckenham

Scan this to navigate to Mills Park

Image attribution: By Sam Wilson, CC BY-SA 4.0, via Wikimedia Commons

Glossary

of the key terms used
in Chapter 2

- **Foothills:** The lower, gently sloping area at the base of hills or mountains.
- **Transition zone**: An area where one type of land changes into another (like from hills to flat plains).
- **Collection area**: A place where water gathers from smaller streams and flows into bigger waterways.
- **Wider waterways:** Rivers or streams that have spread out and become broader as they flow downstream.
- **Lower-flowing streams:** Streams where the water moves more slowly, usually because the land is flatter.

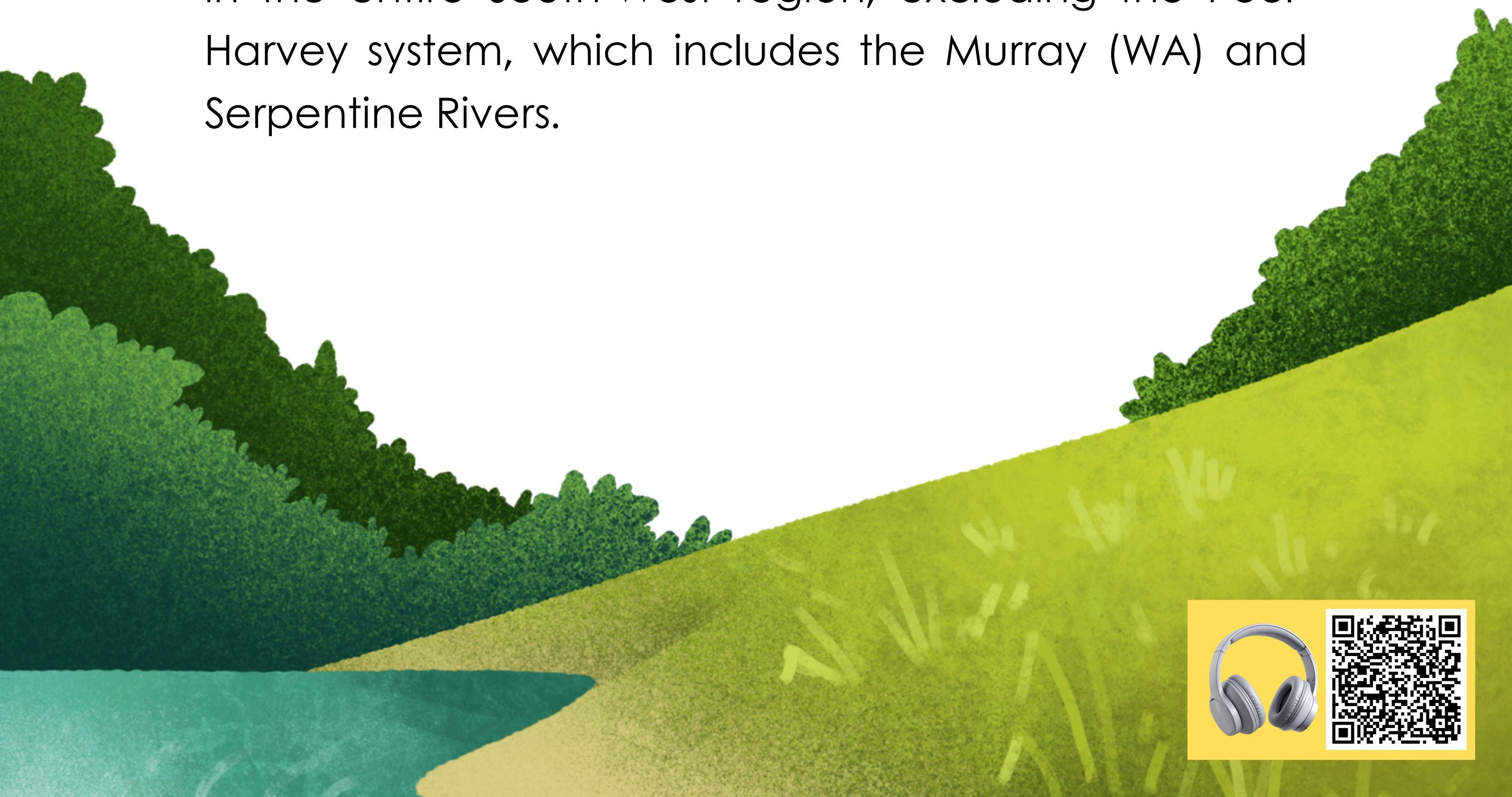
Chapter 3: Main Rivers

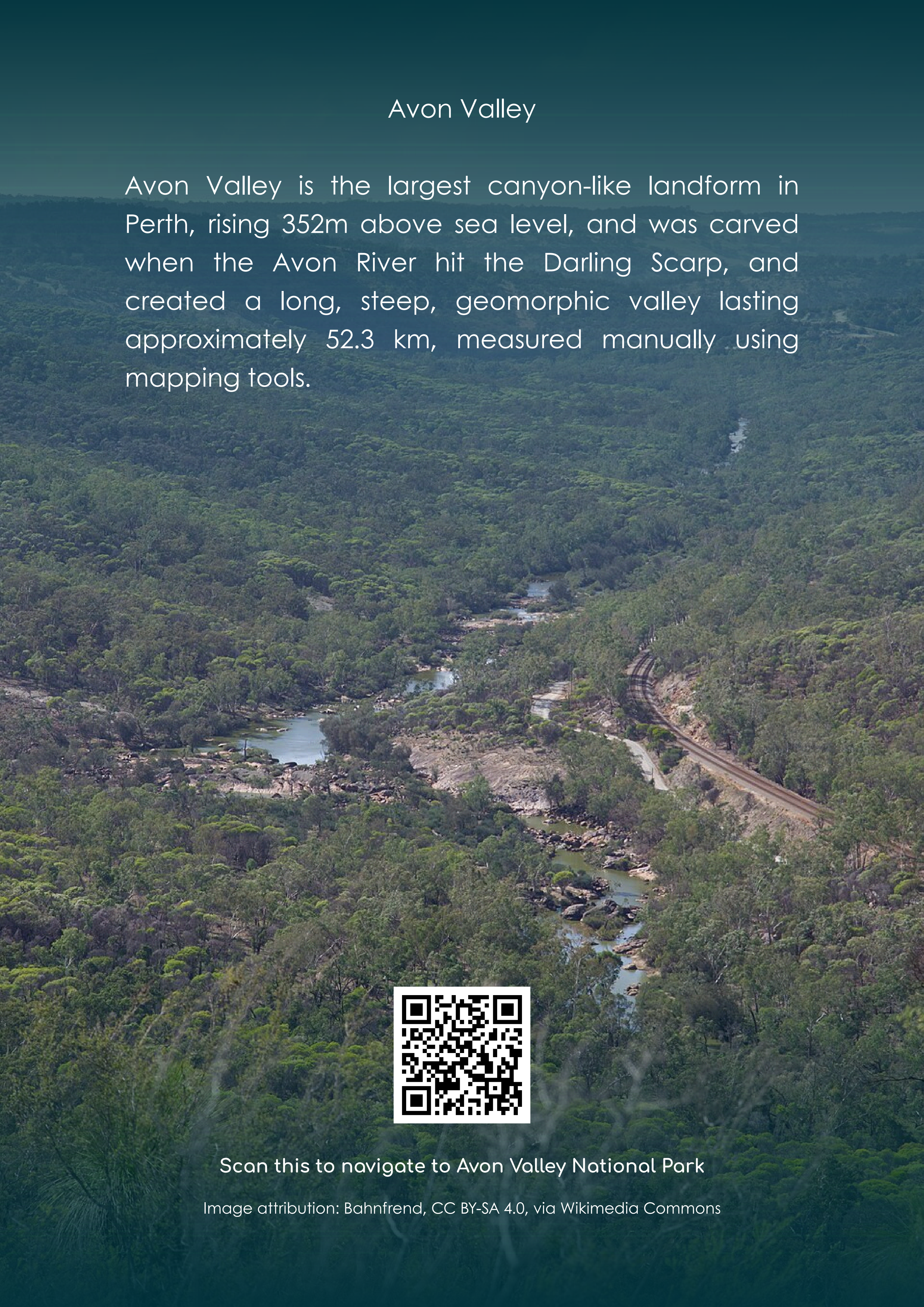
Perth has multiple major rivers that make up the backbone of it's water system. These include true rivers like the Avon, large tributaries like the Canning and Helena, and massive estuarine systems like the Peel-Harvey and Swan.

The Avon River starts just after Bell Rapids and goes downstream all the way until East Pingelly, more than 2 hrs. 20 min from Perth CBD.

The **Canning River**, on the other hand, starts close to the CBD and drifts south into Perth Hills, joining with many smaller tributaries, such as the Darkin, Yule and Southern Rivers.

Together, these make up over 80% of the Catchments in the entire South-West region, excluding the Peel-Harvey system, which includes the Murray (WA) and Serpentine Rivers.





Avon Valley

Avon Valley is the largest canyon-like landform in Perth, rising 352m above sea level, and was carved when the Avon River hit the Darling Scarp, and created a long, steep, geomorphic valley lasting approximately 52.3 km, measured manually using mapping tools.

Scan this to navigate to Avon Valley National Park

Image attribution: Bahnfrend, CC BY-SA 4.0, via Wikimedia Commons

Satellite imagery of the Swan River and surrounds

Image Attribution: NASA, Public domain, via Wikimedia Commons

Elizabeth Quay
Optus Stadium

Scan this to navigate to Elizabeth Quay

Image attribution: By Gnangarra, CC BY 2.5 au, Via Wikimedia Commons

Glossary

of the key terms
used in Chapter 3

- **Avon Valley:** A large valley formed by the Avon River as it flows through the landscape near Perth.
- **Avon Valley National Park:** A protected natural area northeast of Perth that preserves parts of the Avon River and its surrounding landscape.
- **Backbone (of a system):** The main part that supports and connects everything else.
- **Canyon-like landform:** A deep valley with steep sides, similar to a canyon.
- **Dams:** Large barriers built across rivers to store and control water.
- **Estuary:** The part of a river where it meets the ocean and mixes with saltwater.
- **Geomorphic valley:** A valley shaped by natural processes like erosion and river flow.
- **Hydrology:** The study of how water moves through the environment, including rivers, rain, and groundwater.
- **Inland rainfall:** Rain that falls far from the coast, usually deeper inside the land.
- **Satellite imagery:** Pictures of the Earth taken from space using satellites.
- **Sea level:** The average height of the ocean's surface, used as a reference point for measuring land height.
- **Toodyay:** A historic town in Western Australia located along the Avon River.

Chapter 4: Swan Coastal Plain

If you don't know what the Swan Coastal Plain is, it's basically a massive, wide dune system with an elevation of 0-85 meters.

By the time water reaches the coastal plain, it has already descended the steep escarpment and has slowed dramatically as its energy is suddenly spent.

This area contains many of Perth's main waterways, including parts of the Swan River and its tributaries, such as the Canning River. These rivers gently travel along the plain as they near the river mouth at Fremantle.

The confluence of the Helena River with the Swan River at Guildford

Scan this to navigate to Kings Meadow Reserve to observe this confluence

Image attribution: By Gnangarra, CC BY 2.5 AU, via Wikimedia Commons

Closer to the coast, freshwater from rivers begin to mix with saltwater from the ocean, forming estuaries like the lower Swan River. These environments are important because they support a wide variety of plants and animals.

The coastal plain is also where most of Perth's population lives. Because of this, waterways here are more affected by human activity, including urban development and changes to natural flow. Even so, they continue to play an important role in supporting ecosystems and managing water across the region.

Overall, the Swan Coastal Plain represents the final stage of the river system, where water spreads out and eventually flows into the ocean.

Glossary

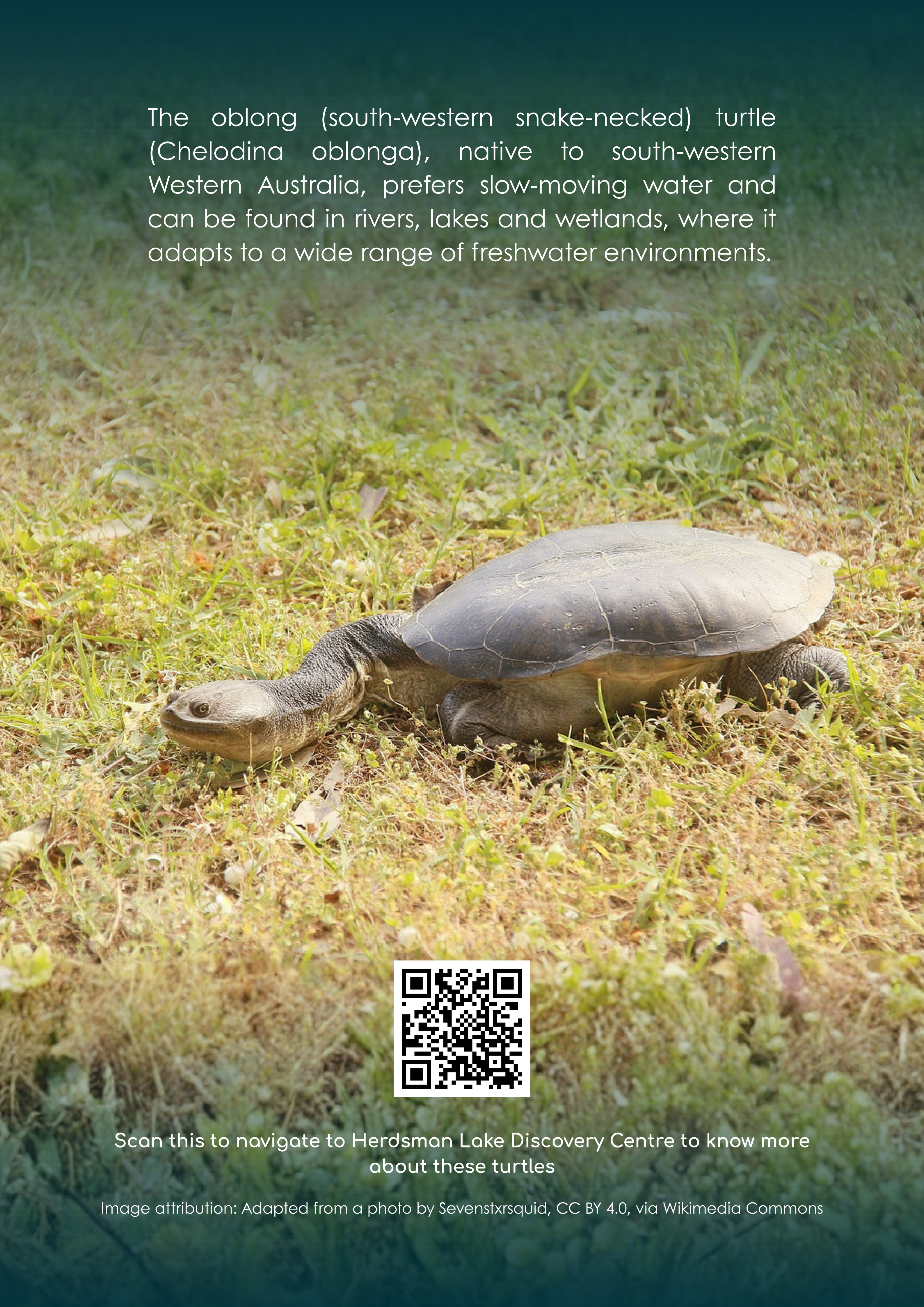
of the key terms
used in Chapter 4

- **Channels**: The paths that water follows as it flows through a river, creek, or stream.
- **Elevation**: The height of land above sea level.
- **Flow** (water flow): The movement and speed of water in a river or stream.
- **Low-lying region**: An area of land that is not very high above sea level and is usually quite flat.

Chapter 5: Fauna in and Around the Streams

As well as the significant geography, all of the streams, creeks, and rivers mentioned in this book have a diverse range of fauna, including crayfish, dolphins, and turtles.

The Perth Hills are rich in fauna biodiversity, with species adapted to the harsh, rocky conditions of these waterways, which are riven with cascades, fast-flowing sections and, in some cases, tourists. Take Lesmurdie Falls, for example. It receives around 54,000 visitors per year, with several hundred visitors per day. Over time, species such as gilgies, swamp tortoises, and nightfish may decline as a result of tourist activities, such as swimming in Lesmurdie Brook.



The oblong (south-western snake-necked) turtle (Chelodina oblonga), native to south-western Western Australia, prefers slow-moving water and can be found in rivers, lakes and wetlands, where it adapts to a wide range of freshwater environments.

Scan this to navigate to Herdsman Lake Discovery Centre to know more about these turtles

Image attribution: Adapted from a photo by Sevenstxrsquid, CC BY 4.0, via Wikimedia Commons

As the water moves into the foothills and coastal plain, the environment changes. The streams become wider and slower, forming deeper pools and calmer areas. These conditions support a greater variety of plants and animals, including waterbirds, fish, and insects. Thicker vegetation along the banks also provides shelter and food for many species.

Closer to the coast, rivers and wetlands support even more life. Areas such as estuaries and lakes are home to animals like black swans and dolphins, which rely on calm, nutrient-rich waters. These ecosystems are important because they connect freshwater and marine environments.

However, many of Perth's waterways are affected by human activity. Urban development, pollution, and changes to natural water flow can impact water quality and reduce the health of these ecosystems. Even small actions can make a difference, meaning everyone, including readers, has a role to play. This can include using water carefully, not littering, reducing pollution, and respecting natural areas when visiting rivers, creeks, and wetlands. Learning about these systems and sharing that knowledge with others is another important way to help protect them.

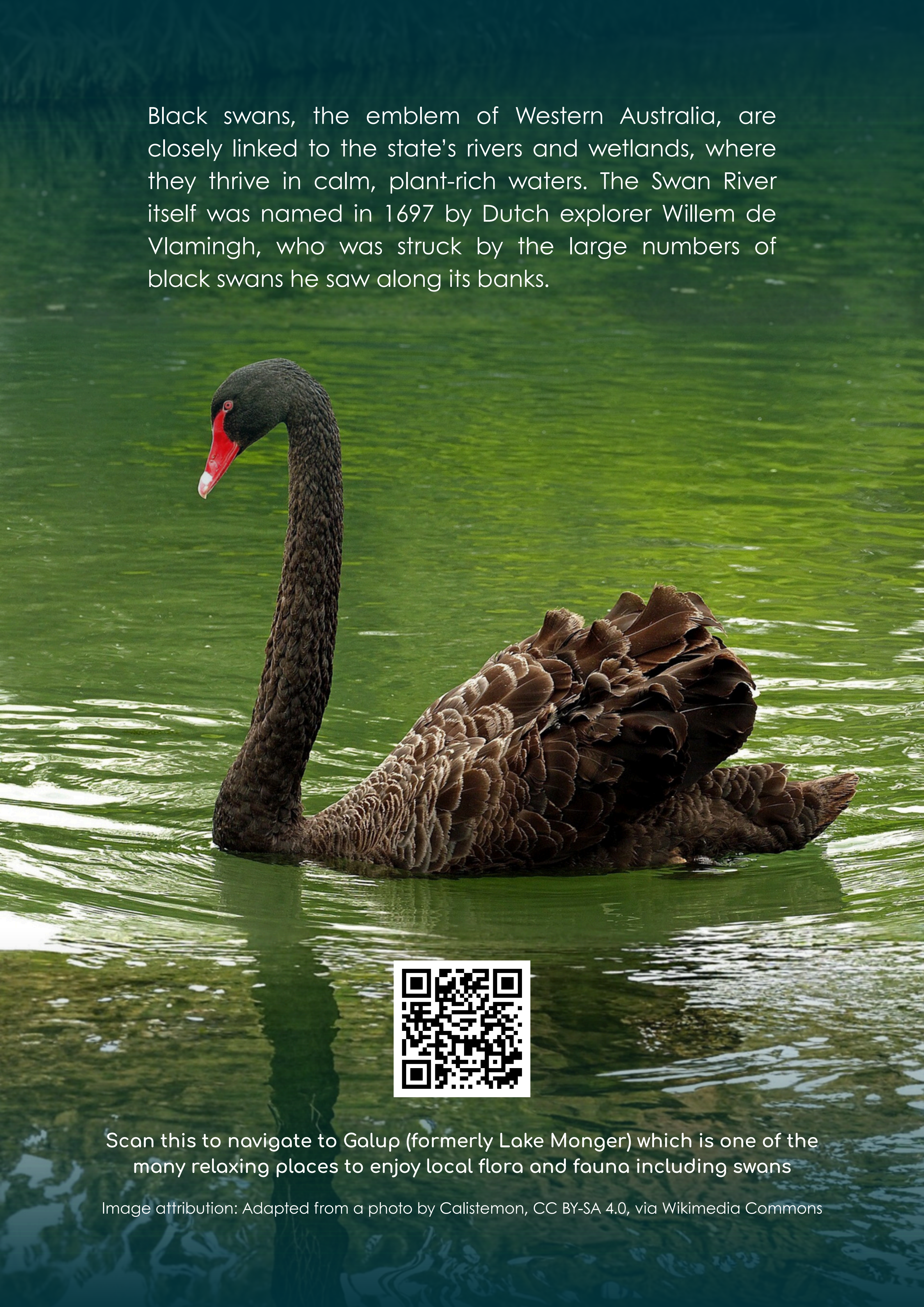
Despite these pressures, Perth's waterways continue to support a diverse range of life. Protecting these systems is important to ensure that plants and animals can continue to survive, and that the natural balance of the environment is maintained for future generations.

Dolphins (Tursiops aduncus) in the Serpentine River
(which also emerges from the Darling Ranges)

Scan this to navigate to Joseph and Dulcie Nannup Trail (next to the river)

Image attribution: Adapted from a photo by Calistemon, CC BY-SA 4.0, via Wikimedia Commons

Black swans, the emblem of Western Australia, are closely linked to the state's rivers and wetlands, where they thrive in calm, plant-rich waters. The Swan River itself was named in 1697 by Dutch explorer Willem de Vlamingh, who was struck by the large numbers of black swans he saw along its banks.



Scan this to navigate to Galup (formerly Lake Monger) which is one of the many relaxing places to enjoy local flora and fauna including swans

Image attribution: Adapted from a photo by Calistemon, CC BY-SA 4.0, via Wikimedia Commons

Glossary

of the key terms
used in Chapter 5

- **Algae**: Simple, plant-like organisms that grow in water, often seen as green layers on rocks or the surface.
- **Currents**: The movement of water in a river, stream, or ocean.
- **Emissions**: Gases or substances released into the air, often from cars, factories, or other human activities.
- **Exoskeletons**: Hard outer coverings on some animals that protect their bodies.
- **Fauna**: All the animals that live in a particular area.
- **Flora**: All the plants that grow in a particular area.
- **Habitats**: Natural places where plants and animals live and grow.
- **Pools**: Deep or still sections of a river or stream where water collects.
- **Species**: Groups of living things that are similar and can breed with each other.
- **Terrain**: The shape and features of the land, such as whether it is flat, hilly, or rocky.
- **Vegetation**: All the plant life growing in a particular area.

Conclusion

The waterways of Perth form a connected system that shapes the landscape and supports life across the region. From the steep slopes of the Darling Scarp to the flat Swan Coastal Plain, water moves through different environments, changing as it travels.

In the hills, streams begin as fast-flowing water over rocky ground. As they move through the foothills, they widen and slow down, forming larger creeks and tributaries. These then join together to create the main rivers, such as the Avon, Canning, and Swan. Finally, the water reaches the coastal plain, where it spreads out into wetlands, lakes, and estuaries before flowing into the Indian Ocean.

Along this journey, waterways provide important habitats for plants and animals and supply water for people. However, they are also affected by human activity, which can impact their health and balance.

These systems are becoming even more important for the future. Western Australia is one of the driest parts of the country, and water scarcity is a growing challenge. Climate change is also affecting rainfall patterns, which can reduce water supply and change how rivers and streams flow. This makes it even more important to understand and protect our waterways.

Everyone has a role to play, from using water carefully to looking after the environment around rivers and streams. By learning about these systems and making responsible choices, we can help ensure that Perth's waterways continue to support life and remain an important part of the landscape for future generations.

About the Author

Aliyaan Jay has a deep curiosity about how the natural world works. From rivers and valleys to weather patterns and microclimates, he explores the environment with both enthusiasm and clarity. He enjoys transforming scientific ideas into organised systems, charts, and structured guides that help others understand complex topics.

This book is his first major project — a comprehensive guide to Perth's waterways, written to inspire other young explorers to look more closely at the landscapes around them.

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